

ABSTRACT

A hybrid parabolic reflector phased array antenna system which is stowable in a space vehicle and is deployable in space. The antenna includes a large torus which acts as a support structure for a plurality of small reflector cells called super elements, each including its own reflector and an array of feed elements. The torus supports a stretched reflector mesh and matching back-up catenary wires that provide a mechanism for pulling the reflector surface of the cells down to an exact paraboloid. A set of rigid corner posts for stretching the mesh fabric for forming multiple reflectors is also provided. The torus is also used to support individual super element feed arrays for each reflector. The super elements incrementally scan the beam by group selection of feed elements in each feed array with time delay phase control being used to steer the array factor so as to achieve fine steering. Each of the super elements scans incrementally with a selected group of feed elements varying between three and twelve, which are varied in position relative to the focal axis of the feed array. The groups of feed elements of the feed arrays are also controlled so as to mitigate any undesired grating lobe problem.